



DoD ATS Selection Process Guide 2005

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- (a) USD(AT&L) memorandum of 28 July 2004
- (b) OUSD(A&T) memorandum of 2 February 2004
- (c) DoD ATS Joint MOA among Service Acquisition Executives of September 2004

Acronyms

ACAT	Acquisition Category
ALO	ATS Leadership Office
AMB	ATS Management Board
ARI	ATS R&D IPT
ASN (RDA)	Assistant Secretary of the Navy (Research, Development and Acquisition)
ATE	Automatic Test Equipment
ATS	Automatic Test System(s)
BSTF	Base Shop Test Facility
CASS	Consolidated Automated Support System
CBA	Cost and Benefit Analysis
CDR	Critical Design Review
CDRL	Contract Data Requirements List
CE&D	Concept Exploration & Definition
CFA	Cognizant Field Activity
CI	Critical Interface
CTAVR	Commercial Tester Acquisition Validation Request
DAB	Defense Acquisition Board
DAC	Days After Contract
DFAR	Defense Federal Acquisition Regulations
D&V	Demonstration & Validation
DID	Data Item Description
DISR	Defense Information Technology Standards Registry
EA	Executive Agent
EAO	Executive Agent Office
ED	Executive Directorate
ECP	Engineering Change Proposal
E&MD	Engineering & Manufacturing Development
FAT	First Article Test
GFE	Government Furnished Equipment
IFTE	Integrated Family of Test Equipment
ILS	Integrated Logistics Support
IOC	Initial Operating Capability
IPT	Integrated Product Team
JTA	Joint Technical Architecture
LCC	Life Cycle Cost
LRU	Line Replaceable Unit
MDA	Milestone Decision Authority
MOA	Memorandum of Agreement
NADEP	Naval Aviation Depot
NAWCAD LKE	Naval Air Warfare Center Aircraft Division, Lakehurst NJ
OSD	Office of Secretary of Defense
O&S	Operation & Support
PEO	Program Executive Officer

PM	Program Manager
PMA	Program Management Activity
POC	Point of Contact
P&D	Production & Deployment
R&D	Research & Development
ROM	Rough Order of Magnitude
SAE	Service Acquisition Executive
SRA	Shop Replaceable Assembly
SRU	Shop Replaceable Unit
SSM+	System Synthesis Model Plus
TPS	Test Program Set
UUT	Unit Under Test
VECP	Value Engineering Change Proposal
WIPT	Weapon System Integrated Program Team
WRA	Weapons Replaceable Assembly
WWW	World Wide Web

1. Purpose

This document provides the procedures and tools needed by the DoD Program Manager (PM) to implement the requirements of reference (a) with regard to the selection of Automatic Test Systems (ATS). It presents the process for preparing requests for deviation to the DoD ATS acquisition policy when the selection process yields a non-Family ATS solution and the validation process that is required when a commercial tester is selected. PMs may obtain assistance and advice on the processes contained herein from their Service's ATS Leadership Office (ALO) member (see Attachment (1)) and should contact the ALO early in the ATS acquisition process.

2. Scope

This guide applies to all ATS acquired within DoD for use at all levels of maintenance and for use at the factory (in either a production role or a support role) when provided as Government Furnished Equipment (GFE).

3. Definitions

A. Automatic Test System (ATS)

A fully-integrated, computer-controlled suite of electronic test equipment hardware, software, documentation, and ancillary items designed to verify at any level of maintenance the functionality of Unit Under Test (UUT) assemblies. An ATS combines the following three elements:

- (1) Automatic Test Equipment (ATE). An integrated assembly of stimulus, measurement, and switching components under computer-control that is capable of processing software routines designed specifically to test a particular item or group of items. ATE software includes operating system software, test executive software, and instrument control software.
- (2) Test Program Set (TPS). ATE interface hardware, test program software, documentation and other ancillary equipment that connects the UUT to the ATE. The TPS software performs fault isolation and diagnostics, and can certify a UUT as ready-for-issue. Ancillary hardware consists of probes, holding fixtures and peculiar instrumentation.
- (3) Test Environment. The test environment includes a description of the ATS architecture, programming and test specification languages, compiler, development tools and provisions for capturing and using UUT design requirements and test strategy information in the generation and maintenance of TPS software.

B. ATS Family

An ATS Family consists of ATSs that are interoperable and have the capability to support a variety of weapon system test requirements through flexible hardware and software architectures that permit addition or expansion of testing capability with minimal impact to the ATS logistics support profile, system software and TPSs.

C. ATS Technical Framework

The framework upon which an open systems architecture for automatic test systems is implemented. It defines key interfaces for an ATS using commonly accepted specifications or standards which may be defined by industry consensus and are utilized by many suppliers. An effective ATS open system architecture relies on physical modularity and functional partitioning of both hardware and software. The result of this approach is the adoption of ATS designs which are easily modified or upgraded without major impact to the unchanged portion of the ATS or its TPSs, and which promote transportability/interoperability of TPSs. The ATS Technical Architecture is published in the Defense Information Technology Standards Registry (DISR) which replaced the DoD Joint Technical Architecture (JTA).

4. Policy Overview

Reference (a) states the following ATS policy:

“To minimize the life cycle cost of providing automatic test systems for weapon systems support at DoD field, depot, and manufacturing operations, and to promote joint service automatic test systems interoperability, Program Managers shall use approved DoD ATS Families as the preferred choice to satisfy automatic testing support requirements. Commercial-off-the-Shelf (COTS) solutions that comply with the DoD ATS Technical Architecture should only be used if the Milestone Decision Authority concurs that an approved DoD ATS Family will not satisfy the requirement. Automatic Test System selection shall be based on a cost and benefit analysis over the system life cycle.”

The intent of reference (a) is to define an acquisition environment that makes DoD the smartest, most responsive buyer to meet our warfighters’ needs while reducing the total cost of ownership. This will be accomplished through the use of ATS Families as the preferred choice to satisfy automatic testing support requirements. An attachment to reference (a) designates the following DoD ATS Families:

- Consolidated Automated Support System (CASS)
- Integrated Family of Test Equipment (IFTE)
- Marine Corps Automatic Test System (MCATES)
- Joint Service Electronic Combat Systems Tester (JSECST)

Points of contact for each of the ATS Families listed above can be found in Attachment (1).

Requests for designation of additional families may be approved provided that the criteria specified in paragraph 7.D(2) of this guide are met.

Proposed acquisitions of COTS testers must be validated as policy compliant. However, the use of designated DoD ATS Families is encouraged to the greatest extent possible to reduce ATS proliferation and life-cycle operations and support costs. When a COTS solution is planned, the acquiring Service should develop a strategy for standardizing on the planned COTS tester.

Reference (a) requires the use of a Cost and Benefit Analysis (CBA) to ensure that the ATS chosen is the most beneficial to the DoD, not just a particular program or Service, over the system life cycle.

Reference (a) directs Navy to lead a Joint Service ATS Management Board (AMB) to coordinate Service ATS matters. Reference (b) directs that Navy (Naval Air Systems Command PMA260) serve as the DoD ATS Executive Directorate and perform the functions previously performed as the DoD ATS Executive Agent Office.

Reference (a) directs that the Service Acquisition Executives (SAEs) jointly agree on processes and procedures to follow in satisfying automatic test systems requirements. In reference (c), the SAEs have agreed to the processes and procedures in this document. As required by the Joint MOA, the ATS ED has established a policy deviation process for those programs that propose not to use the standard DoD ATS families. This document outlines that process as well as the process for validating that a proposed commercial tester meets the appropriate criteria.

5. ATS Organization

The DoD ATS Organization is graphically depicted in Figure 1. Each Service has an ATS Leadership Office (ALO) with oversight of their Service's implementation of the ATS policy. The O-6 level ATS Management Board is a joint-Service board comprised of representatives from the Army (PM-TMDE), Air Force (WRALC/542ATSG) Marine Corps (MARCORSYSCOM (PMM-161, PM TMDE)), and Navy (NAVAIRSYSCOM, PMA-260). The AMB, chaired by the Director of the ATS ED, provides advice and recommendations to the ATS ED and to Weapon System Program Managers and IPTs (WIPTs). The AMB also reviews policy deviation requests and commercial tester acquisition validation requests, and provides recommendations to the appropriate decision authority. Each Service's AMB representative is the Service lead on all DoD ATS matters for that Service. Several IPTs have been established under the ED and AMB to carry out the main technical functions of the ATS ED. Key points of contact within the ATS ED and each Service ATS organization are provided in Attachment 1 and are available to assist and advise WIPTs on these processes. Each Service ALO includes subject matter experts in the areas of the selection process itself, preparation of the CBA, and performance of parametric analyses.

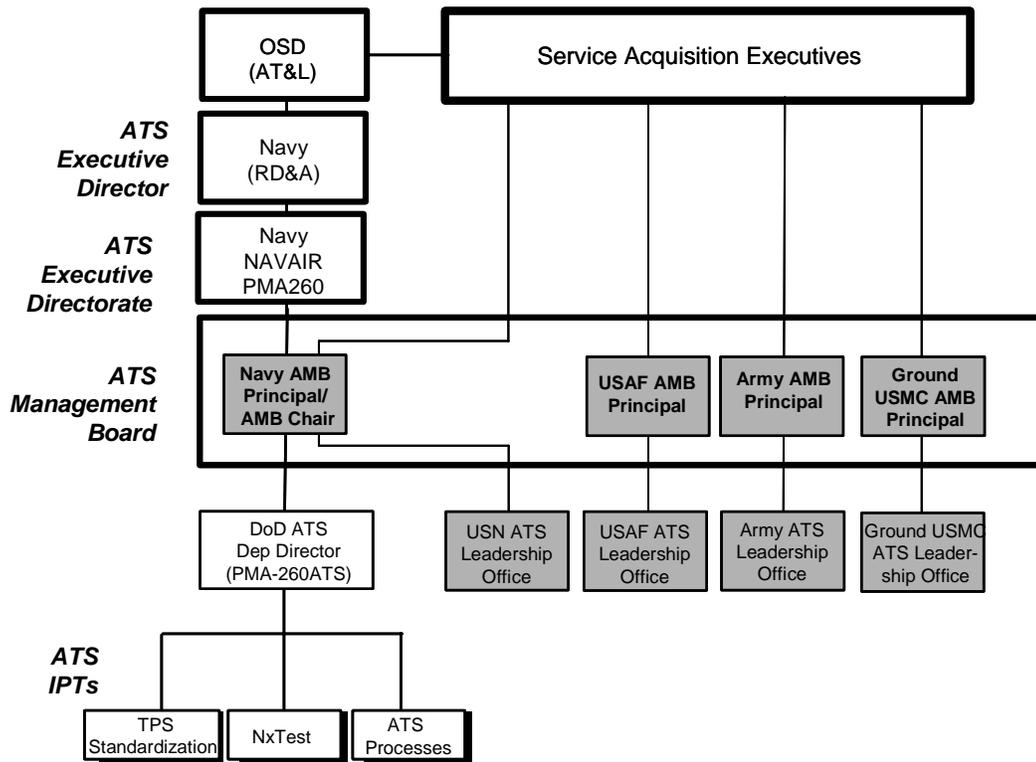


Figure 1. DoD ATS Organization

6. ATS Master Plan

The ATS Executive Directorate publishes a DoD ATS Master Plan which addresses the implementation of DoD ATS acquisition policy, investment strategy, and modernization strategy. The Master Plan also describes each of the ATS families currently in the DoD inventory. It is available at <http://www.acq.osd.mil/ats>.

7. ATS Selection Process

When an ATS is required, whether it is during the development of a weapon system, replacement due to ATS obsolescence, or modification of an ATS, an appropriate ATS solution must be selected. The process shown in Figure 2 provides a structured approach to ATS selection. This process consists of four primary steps: (1) definition of weapon system support/test requirements, (2) definition of ATS alternatives, (3) analysis of alternatives, and (4) alternative selection.

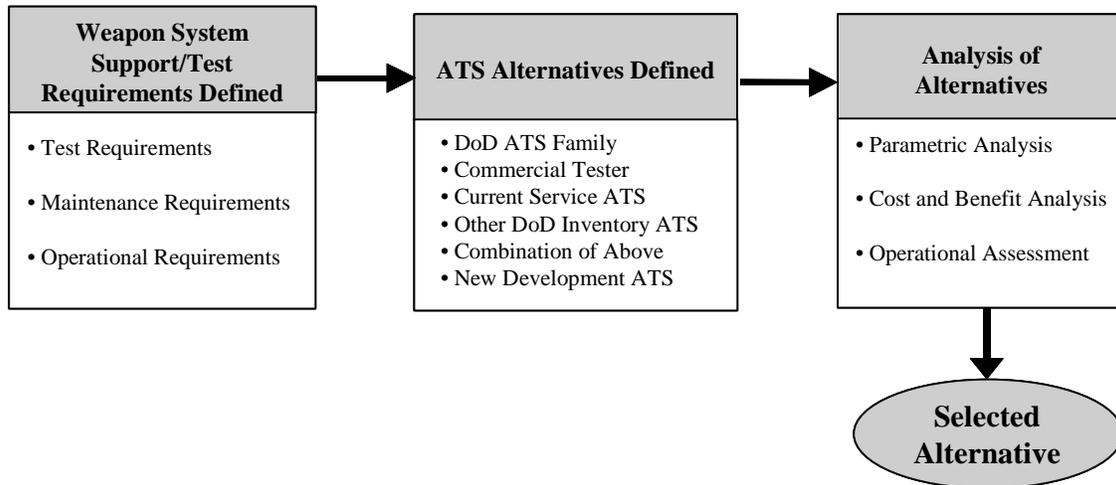


Figure 2. ATS Selection Process

A. Requirements Definition

The selection process begins with an understanding of the test requirement, i.e., parametric (performance), maintenance and operational test requirements for the targeted units to be tested.

B. Support Alternatives

Once the test requirements are thoroughly defined, potential ATS alternatives can be considered. The intent of the policy is the selection of ATS in a DoD context: i.e., DoD's investment in ATS must be leveraged within the Service and/or across each Service. The following hierarchy is provided for the selection of ATS consistent with DoD ATS acquisition policy:

- DoD Designated ATS Family
- Commercial Tester¹

- Current weapon System/Service ATS²
- Other DoD Inventory ATS²
- New Development ATS²

¹ Commercial Tester Acquisition Validation Request required

² Policy Deviation Request required

C. Selected Alternative Analysis

Prior to selecting an ATS alternative, an analysis must be made to assess the ability of each alternative to support the maintenance and operational requirements of the weapon system in a cost-effective manner over the life-cycle of the system. The analysis must include the closest-fit DoD ATS Family. While the specifics of how these analyses are performed are not mandated, the ATS ED has made available to facilitate the process the Navy's System Synthesis Model (SSM+) to assist in the parametric analysis, and a CBA template to facilitate consistent and comprehensive analyses. When required, the results of these analyses can be used to support a policy deviation request or a commercial tester acquisition validation request.

(1) Parametric Analysis

As part of the ATS selection process, an objective comparison of Unit Under Test (UUT) parametric test requirements versus the test capability of candidate testers must be performed. To facilitate these parametric analyses, the ATS ED has identified an automated tool that compares UUT testing requirements against ATE test capabilities. This tool, SSM+, maintained and managed by NAWCAD LKE contains a database of the parametric test capabilities of a variety of ATE within DoD, including the DoD ATS Families, and a mapping function for comparing UUT testing requirements to these tester capabilities. Once UUT testing requirements have been loaded into SSM+, analyses can be performed to determine which Family tester can best support the specific testing requirements. The analyses will also identify UUT test requirements that the candidate testers cannot meet and will output these requirements as "exceptions". Additional ATE can be included in the SSM+ for UUT mapping. If this capability is desired, the specifications of the ATE will be provided to NAWCAD LKE so that the ATE's parametric test capabilities can be modeled in SSM+, allowing the test requirements to be mapped to the ATE. Attachment 2 provides further guidance on using SSM+.

(2) Operational Assessment

Operational constraints must be evaluated in conjunction with the UUT test requirements. Operational requirements such as transportability (e.g., man-portable), environmental (e.g., excessive temperature, EMI or humidity), or deployability (e.g., rapidity of deployment) of the ATE may be factors in the determination of an effective ATS solution.

(3) Cost and Benefit Analysis

Another component of the ATS selection process is a CBA to ensure that the ATS chosen is the most cost beneficial to the DoD over the life cycle. The alternatives to be considered by the program office in the trade-off must include a DoD ATS Family member. The proposed alternative may take several forms: a commercial tester, the use or modification of existing ATS, or a weapon system-peculiar new development ATS. To assist the PM with this analysis, the ATS ED has developed a CBA template specifically for this purpose. A guide to using the CBA template is provided in Attachment 3.

D. DoD ATS Families

(1) Family Evaluation

The analysis for selecting an ATS alternative begins with evaluation of the DoD ATS Families. To conduct a thorough evaluation of the ATS Families, the Family PMs will provide cost, schedule, and performance information regarding their ATS programs to the Service ALO assisting with the evaluation. The cognizant weapon system/ATS PM is ultimately responsible for the evaluation. However, throughout the ATS selection process, the Service ALO acts as a liaison to the ATS Family program managers, assists in the decision making process, and advises the weapon system/ATS PM regarding the documentation for this process. If the information provided by the ATS Family PM reveals an obvious cost, schedule, or performance deficiency with their system, the Service ALO can make recommendations and assist in preparing an abbreviated Policy Deviation Request or Commercial Tester Acquisition Validation Request on this basis. The abbreviated requests will follow the same process but may forego the more detailed analysis otherwise required. Additionally, the ATS ED is available for assistance at any step of this process. Any questions regarding this process should be directed to the points of contact provided at Attachment 1.

(2) New Family Criteria

The use of ATS Families is encouraged and is in compliance with the acquisition policy. However, if the analysis yields a non-family solution and the weapon system/ATS PM believes the solution demonstrates characteristics similar to those of an ATS Family, there are provisions for introducing a new family into the DoD inventory. An ATS Family consists of ATSs that are interoperable and have the capability to support a variety of weapon system test requirements through flexible hardware and software architectures. For a tester to be considered as a new ATS Family the following criteria must be met:

- the tester must be capable of supporting multiple weapon systems
- the tester must have flexible hardware and software architectures that are expandable and tailorable with minimal impact to existing logistic support profiles and TPSs
- the tester must provide a capability that an existing ATS Family does not
- the tester must provide a more cost effective/beneficial ATS solution than use or modification of the applicable existing ATS Family

- the tester must be reprocurable
- the tester must have a dedicated management office with a process in place to ensure that long term tester viability is maintained and that the tester will evolve to support future requirements.

Organizations desiring to initiate action to establish a new DoD ATS Family must contact the Service ALO.

8. Policy Deviation Process and Flow

A. Deviation Criteria

A Policy Deviation Request is required prior to the acquisition or modification of any ATS in the following cases:

- development or procurement of new ATE that is not part of a designated DoD ATS Family unless it is a compliant acquisition of a COTS tester which has been validated by the AMB,
- re-procurement of existing ATS that is not part of a designated ATS Family
- modification to existing ATE that is not part of a designated ATS Family when the modification adds capability to the ATE for testing additional UUTs
- development or procurement of new TPSs for use on ATE that is not part of a designated ATS Family unless the target ATE is a COTS tester which has been validated by the AMB, and
- modification or rehost of an existing TPS for use with ATE that is not part of a designated ATS Family when the change/rehost adds significant capability to the ATS for testing additional UUTs, unless the target ATE is a COTS tester which has been validated by the AMB.

The only exception to this policy is the use of validated commercial testers, which is further discussed in paragraph 9.0.

Table (1) below summarizes the requirements for policy deviations.

Situation/Desired ATS Solution	Policy Deviation Required?	Commercial Tester Acquisition Validation (CTAVR) Required ?	Decision Authority
DoD-designated ATS Family Member	No	No	N/A
Sustainment effort that does not add capability to the ATS for testing additional UUTs	No	No	N/A
Non-ATS Family Commercial Tester	No	Yes	MDA
Current weapon system/Service ATE	Yes	NA	SAE*
Other DoD inventory ATE	Yes	NA	SAE*
Development of new ATE	Yes	NA	SAE*
Reprocurement of existing ATE that is not part of a designated ATS Family or validated commercial tester	Yes	NA	SAE*
Modification of existing ATE that is not part of a designated ATS Family or validated commercial tester when the modification adds capability for testing additional UUTs	Yes	NA	SAE*
Development or procurement of new TPSs for use on ATE that is not part of a designated ATS Family or validated commercial tester	Yes	NA	SAE*
Modification or rehost of an existing TPS for use with ATE that is not part of a designated ATS Family or validated commercial tester when the change/rehost adds capability to the ATS for testing additional UUTs	Yes	NA	SAE*

**For ACAT I programs before milestone C. For other programs, the cognizant milestone decision authority.*

Table 1. Requirements for Policy Deviations

B. Deviation Approval Process Flow

The process for obtaining approval of an ATS Policy Deviation Request is depicted in figure (3) and described below:

- (1) The Service ALO will provide representation to the weapon system IPT to assist in the ATS selection process, and after complying with any internal Service regulations or procedures will forward any Policy Deviation Requests recommended for approval to the AMB.

If the analysis reveals an obvious cost, schedule, or performance deficiency with the ATS Families, the Service ATS representative can make recommendations and assist the weapon system/ATS PM in preparing an abbreviated policy deviation request on

this basis. The abbreviated requests will follow the same process but may forego the more detailed analysis otherwise required.

- (2) The AMB will review all Policy Deviation Requests from a DoD perspective rather than a program-specific basis for necessity, completeness and accuracy and the ATSED will submit a recommendation to the Service PM and MDA.
- (3) If the AMB does not reach agreement, the recommendation to the MDA will state the reasons for the lack of agreement to provide the MDA with all relevant decision-making information.
- (4) (a) For ACAT 1 programs before Milestone C, the MDA may:
 - (1) recommend approval of the deviation request and forward it to OSD(AT&L) for endorsement to the Defense Acquisition Board (DAB), or
 - (2) disapprove the deviation request, return it to the PM/Program Executive Officer (PEO) for reconsideration.
- (b) For ACAT I weapon systems programs beyond Milestone C and all lesser ACAT programs the MDA may:
 - (1) approve the deviation request and return it to the PM/PEO for acquisition action, or
 - (2) disapprove the deviation request and return it to the PM/PEO for reconsideration.
- (5) The MDA will inform the AMB of the disposition of all deviation requests.

Existing Service waivers for the use of other than approved DoD ATS Families remain in effect. However, Program Managers will plan for bringing legacy ATS systems into compliance with the DoD ATS Technical Framework when it operationally makes sense and/or is cost effective to do so.

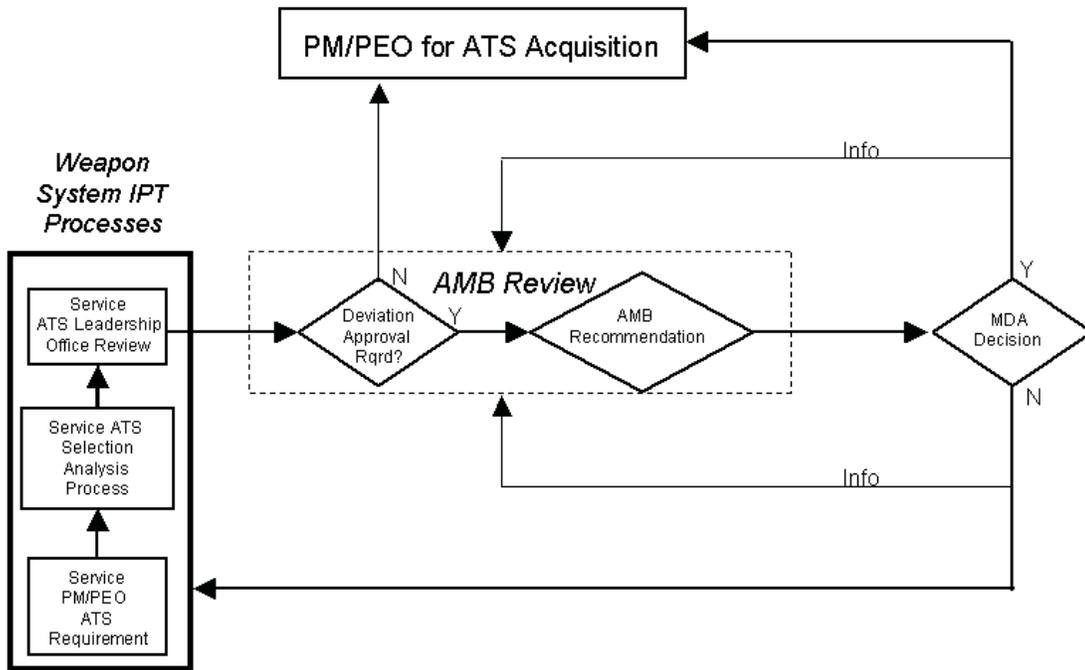
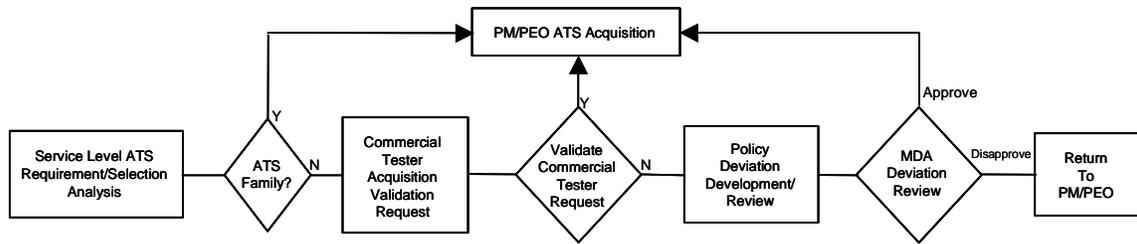


Figure 3. ATS Policy Deviation Process

C. Policy Deviation Approval Form

A structured form to process the Policy Deviation Request is provided as Attachment 4 and must be completed before the deviation request begins the approval process. The form provides a means to address the issues related to the selection of the ATS and to provide the results of any analysis that may be required to identify the cost, schedule, parametric, and/or operational deficiencies that led to a decision not to select a DoD ATS Family as a solution. It also provides a means to document approval or disapproval by the appropriate decision authority. A copy of this form can be downloaded from the ATS ED WWW Site (<http://www.acq.osd.mil/ats/spg-att4.doc>).



D O D A T S R O L E S & S E L E C T I O N R E S P O N S I B I L I T I E S P R O C E S S	PM/PEO	<ul style="list-style-type: none"> - Parametric analysis of UUT Requirements vs ATS - Operational Assessment - Maintenance Rqmts 	<ul style="list-style-type: none"> - Prepare Commercial Tester Acquisition Validation Request 	<ul style="list-style-type: none"> - Support Commercial Tester Acquisition Validation Request 	<ul style="list-style-type: none"> - Develop Cost Benefit Analysis - Document Parametric Analysis, Operational Assessment, and Maintenance Rqmts - Support Deviation Request 	<ul style="list-style-type: none"> - Support Deviation Request - Implement MDA Decision
	Service ALO	<ul style="list-style-type: none"> - Determine if proposed solution meets policy criteria - Provide input to ATS Master Plan - Conduit for ATS ED data 	<ul style="list-style-type: none"> - Assist PM/PEO - Review Commercial Tester Acquisition Validation Request 	<ul style="list-style-type: none"> - Sponsor and make preliminary recommendation to AMB 	<ul style="list-style-type: none"> - Assist PM/PEO review deviation request and sponsor to AMB 	<ul style="list-style-type: none"> - Track deviation request through the review cycle
	AMB	<ul style="list-style-type: none"> - Provide guidance to Service AMB Rep - Coordinate tech support of ATS Family 	<ul style="list-style-type: none"> - Provide guidance to Service ALO 	<ul style="list-style-type: none"> - Review Commercial Tester Acquisition Validation Request - Review ATS Master Plan for opportunities to leverage investments 	<ul style="list-style-type: none"> - Provide guidance to Service ALO - Provide recommendation to MDA - Review ATS Master Plan for opportunities to leverage investments 	
	ATS ED	<ul style="list-style-type: none"> - Assist Service AMB Rep - Provide additional technical expertise - Update ATS Master Plan 	<ul style="list-style-type: none"> - Assist Service AMB Rep - Provide additional technical expertise 	<ul style="list-style-type: none"> - Update ATS Master Plan if required 	<ul style="list-style-type: none"> - Track deviation request - Assist Service AMB Rep 	<ul style="list-style-type: none"> - Track deviation through the review cycle - Update ATS Master Plan if required

Figure 4. Roles and Responsibilities in the ATS Selection Process

9. Commercial Tester Acquisition Validation Process

The acquisition of commercial testers is permitted when the MDA determines that a DoD ATS Family will not satisfy the support requirement. However, each tester must go through a validation process to ensure that:

- the tester meets the definition for a commercial item in the DFAR
- the commercial tester acquisition is the most economical solution based on a simplified Life Cycle Cost (LCC) analysis and
- the tester meets all DoD ATS Technical Architecture requirements.

In addition, a description of any non-recurring effort associated with integrating components must be provided.

The approval process for the CTAVR is provided as Figure 5. The request form will be initiated by the WS/ATS PM with assistance from the Service ALO. Once the form is prepared, the Service ALO will sponsor the request to the AMB for its review. A copy of this form is provided as Attachment 5. A copy of this form can also be downloaded from the ATS ED WWW Site (<http://www.acq.osd.mil/ats/ctavr.doc>).

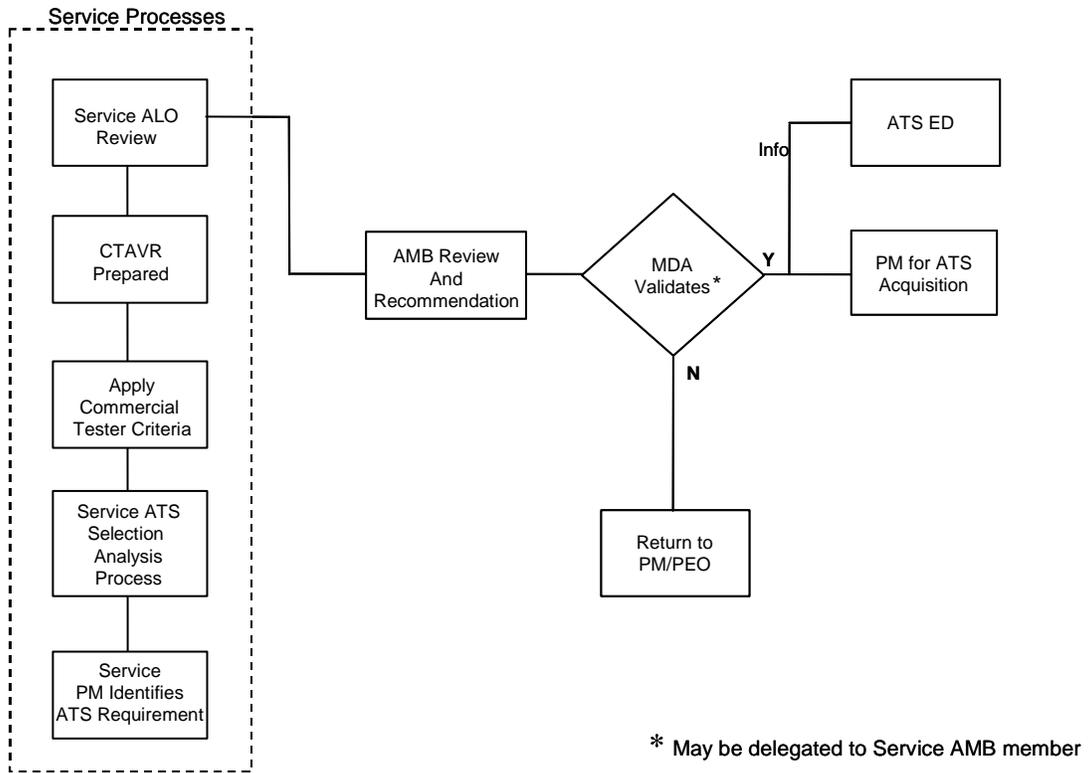


Figure 5. DoD ATS Commercial Tester Acquisition Validation Process

Attachment 1. DoD ATS Selection Process Key Points of Contact

ATS Executive Director

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ATS Executive Directorate

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Attachment 2. System Synthesis Model (SSM+)

SSM+ Overview: SSM+, maintained and managed by NAWCAD Lakehurst, is an integral part of the Navy's ATS planning process. It provides a parametric mapping model to determine optimum ATE station configurations. It is also a valuable tool that can be used in performing parametric analyses as part of the DoD ATS selection process. SSM+ provides DoD Program Managers with an automated tool for mapping a weapon system's Unit-Under-Test (UUT) test requirements to ATS within the DoD ATS Family or any other target ATS platform. SSM+ maps UUT test requirements to target ATS test capabilities and identifies limitations of candidate ATS platforms to support the UUT test requirements. Currently there are over a dozen ATS Families modeled in SSM+, including CASS, IFTE, the F-15 Downsized Tester, RF METS, TETS, and the Teradyne L393 Family of ATE. For ATS not currently modeled in SSM+, users can request a web-based account to input ATS specifications into the SSM+ ATS Test Capability database.

SSM+ Parametric Analysis Process: SSM+ parametric analysis is a three step process consisting of: (1) UUT Parametric Test Requirement Data Collection, (2) UUT Parametric Test Requirement Data Entry, and (3) SSM+ Parametric/Exception Analysis. These three steps are explained herein.

Step 1. UUT Parametric Test Requirement Data Collection: SSM+ data sheets outline SSM+ UUT test requirement data which must be collected to run SSM+ against a set of UUTs. There are currently a total of 28 test categories, each of which contains several parametric fields as required to specify the test requirement. Figure 6 shows a sample of the test categories and associated parametric fields.

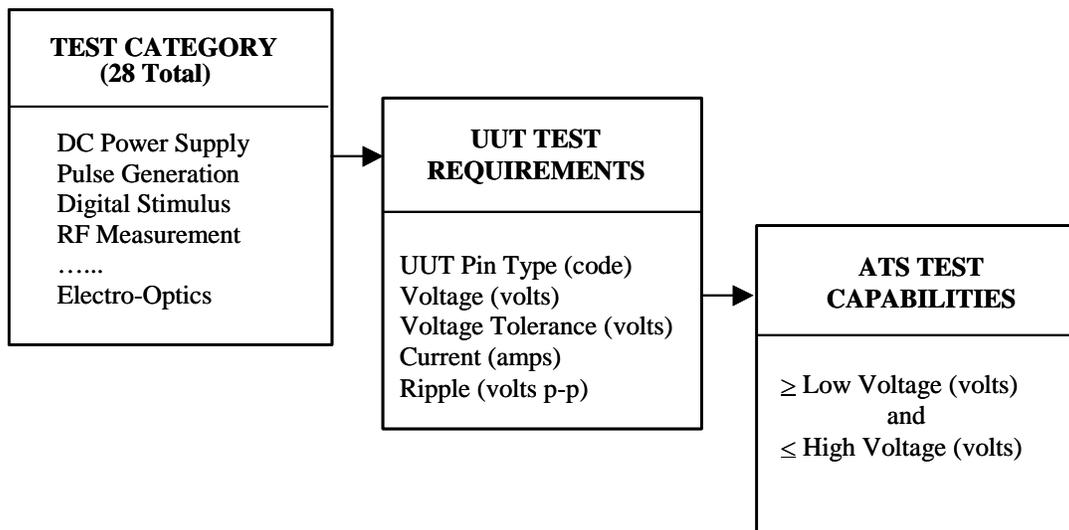


Figure 6. SSM+ Test Categories and Parametric Fields

For each UUT, SSM+ data should be collected for all applicable test categories. SSM+ data sheets are available on-line once an SSM+ account has been set up through the Service ALO and NAWCAD Lakehurst.

While it is recognized that the collection of UUT test requirement data can be the most time-consuming and difficult part of the process, the collection of the most complete and accurate data available is essential to obtain valuable SSM+ results. It is also recognized that the level of parametric data available for a given weapon system or set of UUTs is directly dependent on its life cycle phase. For each specific program phase of the weapon system's acquisition, the following guidance is provided for collecting test requirement data:

- Concept Exploration & Definition (CE&D) Phase: During the CE&D phase, parametric test requirement data is not expected to be available. ATS analysis at this time would likely be limited to identifying any unique operational or environmental ATS requirements need to support the system (man-portable, for example).
- Demonstration & Validation (D&V) Phase: During the D&V phase, SSM+ parametric test requirement data will typically consist of the parametric data envelope of the weapon system as a whole.
- Engineering & Manufacturing Development (E&MD) Phase: During the E&MD phase, SSM+ parametric test requirement data should be available for each WRA/LRU and SRA/SRU. This parametric test requirement data can be found in the contractual specification for each WRA/LRU and SRA/SRU at the time of the Critical Design Review (CDR).
- Production & Deployment (P&D) Phase: During the P&D phase, SSM+ parametric test requirement data should be available for each WRA/LRU and SRA/SRU. This parametric test requirement data should be based on actual parametric data for each WRA/LRU and SRA/SRU at the time of the First Article Test (FAT).
- Operation & Support (O&S) Phase: During the O&S phase, SSM+ parametric test requirement data should be available for each WRA/LRU and SRA/SRU. This parametric test requirement data should be based on actual parametric data for each fielded WRA/LRU and SRA/SRU. SSM+ data should be updated as Engineering Change Proposals (ECPs) are incorporated into the weapon system.

Test requirements data should be captured by technical/engineering personnel familiar with the design and operation of the weapon system UUTs. Ideally, the requirement to provide SSM+ parametric data should be imposed upon the prime contractor responsible for design and development of the weapon system.

Step 2. UUT Parametric Test Requirement Data Entry: Once SSM+ parametric test requirement data has been collected against a weapon system or set of UUTs, this data needs to be entered into the SSM+ UUT Test Requirement Database. SSM+ is hosted at NAWCAD Lakehurst and can be accessed via the internet. Representatives from Service ALO have been

provided with SSM+ accounts and trained in the use of SSM+. The Service Parametric Analysis/SSM+ points of contact identified in Attachment 1 may be contacted for assistance in loading UUT Parametric Test Requirements into SSM+.

Step 3. SSM+ Parametric/Exception Analysis: Once UUT test requirement data has been entered into SSM+, it can be mapped to ATE test capabilities for all ATS Families contained in the SSM+ database. A variety of reports can then be generated which identify how well each ATS alternative can support the UUT test requirements.

One of the key SSM+ outputs for the DoD ATS selection process is the exception report which provides an assessment of the limitations of a target ATE station to fully support a UUT without Interface Device (ID)/Interface Test Adapter (ITA) or Test Program Set intervention. SSM+ classifies these exceptions into one of the following three categories:

- *Soft Exceptions:* These are considered negligible and no ID/TPS intervention is anticipated.
- *Medium Exceptions:* Minor ID/TPS intervention is anticipated to overcome these exceptions (voltage dividers, for example).
- *Hard Exceptions:* Complex ID/TPS intervention is anticipated to overcome these exceptions (complex circuitry in ID, external test equipment, for example).

Evaluation of these exceptions should be performed by engineering or technical personnel familiar with the weapon system UUTs and/or the target ATS platforms. Exception classifications serve to provide initial guidance in evaluating exceptions and to assist in comparing suitability of various ATE platforms to support a weapon system's test requirements. In assessing the ability of various ATS platforms to provide overall support to a weapon system, the following should be considered:

- *Number of UUTs requiring ID/TPS Intervention:* 50 exceptions against 5 UUTs may prove more desirable than 20 exceptions against 10 UUTs.
- *Number of Hard Exceptions:* Hard exceptions would typically result in costly TPS development efforts.
- *Number of Medium Exceptions:* Medium exceptions may increase TPS development costs.
- *Diversity of Exception Types:* Numerous exceptions of one type may require only one complex ID while several different exception types may drive several complex IDs.

An iterative process for ATS selection by exception analysis is provided in Figure 7.

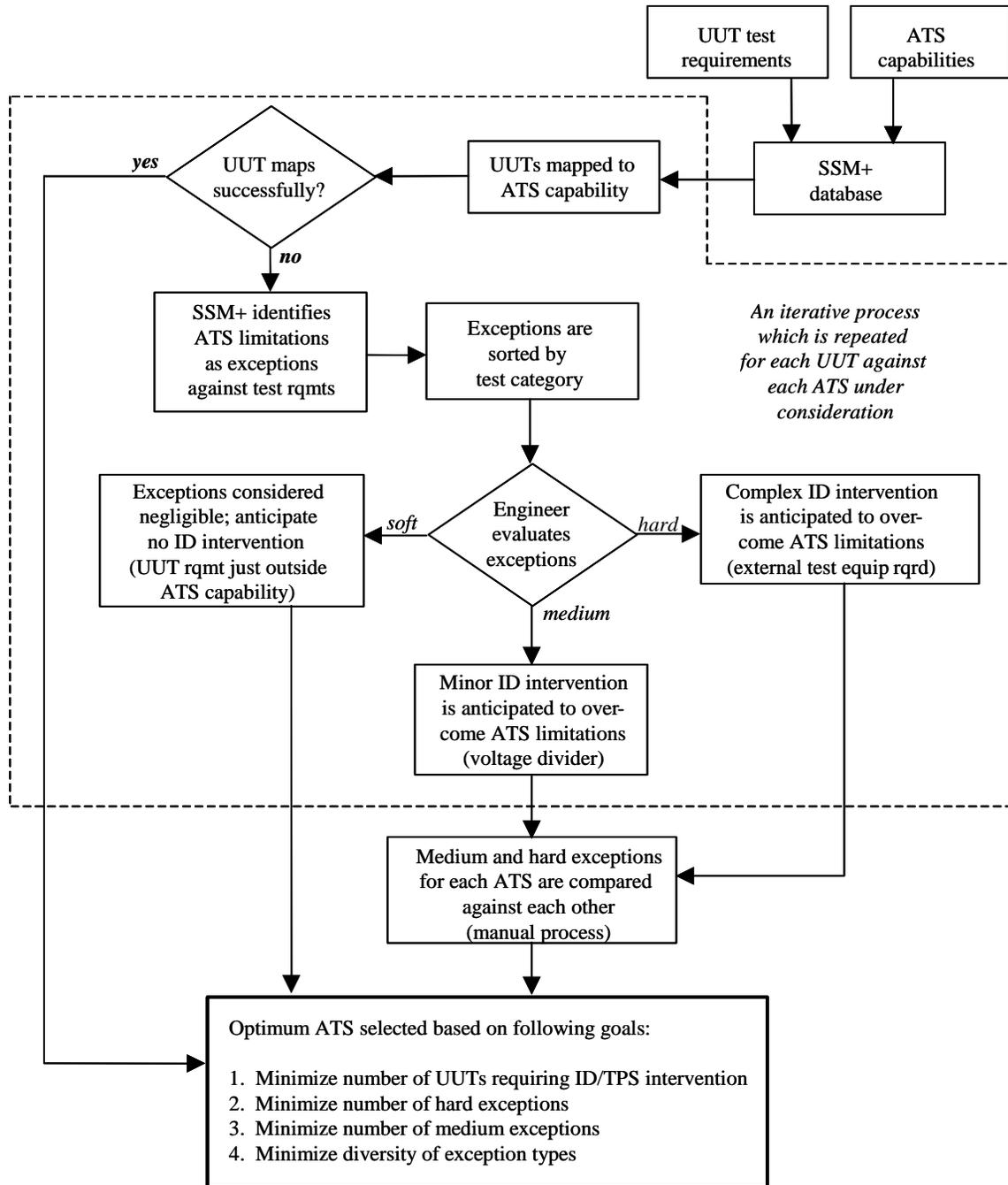


Figure 7. ATS Selection by SSM+ Exception Analysis

SSM+ Customer Support: A SSM+ user account and User's Manual can be obtained by contacting:

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Help with SSM+ can be obtained by contacting the appropriate Service ALO representative identified in Attachment 1 or the NAWCAD Lakehurst representative identified above.

Attachment 3. Guide to Conducting a CBA

An ATS CBA requires calculating costs in a number of areas for both the selected alternative and the closest-fit DoD ATS Family. There are two major components to the CBA:

1. Qualitative Factors: The CBA must address several qualitative factors. Section (1) of this attachment provides instructions and the Qualitative Analysis Table (table (3)) that must be completed. The qualitative factors are defined in Section (2) of this attachment. Section (3) provides a form for presenting the rationale and source of each of the Qualitative Factor scores assigned.
2. Cost Factors: Provided in Section (4) of this attachment are the definitions of the cost categories that must be considered in the CBA. These cost categories are considered the major cost areas for any ATS analysis. The costs for each option must be provided on the Cost Analysis Summary Form in Section (5). Section (6) is a form for presenting the rationale and source of the cost estimates. The costs associated with DoD ATS Families can be obtained by contacting the respective ATS Family Program Manager's office. Refer to Attachment 1 of this Guide for the points of contact.

The set of forms (Sections 1, 3, 5 and 6) must be completed for each ATS considered.

The requesting program office is encouraged to provide the MDA with a separate summary of pros and cons to assist in evaluating the request.

Section (1) – Procedures for Qualitative Analysis

To document the qualitative analysis for each alternative under consideration, Table 3 must be completed to list for each qualitative factor a subjectively assigned rating level (Level 1, 2 or 3) number that represents how well the alternative is expected to satisfy a given qualitative criteria. The rating definitions, or levels, are in section (2) of this attachment with examples of what would be considered a low (level 1), medium (level 2), and high (level 3) rating. Generally, the meaning of each level is indicated in the following table.

Rating Level	Description
Level 1	Minimum Acceptable
Level 2	Average
Level 3	Exceptional

Table 2. Expected Performance Rating Levels

The column titled “comment” may be used to provide any amplifying data beyond that provided on the Qualitative Factors Back-Up Form (Section 3).

Alternative:		
Criteria	Expected Performance Rating	Comment
Ease of Use		
Operational Suitability		
TPS Transportability		
Upgradeability		
Age of ATS		
Vertical Commonality		
Horizontal Commonality		
Life Cycle Supportability		
Ease of TPS Development		
Adaptability		

Table 3. Qualitative Analysis Table

Section (2) – Definition of Qualitative Criteria

Criteria	Definition
Level 1 (Worst Case)	<i>Descriptions of levels are provided merely as relative examples of ATS capabilities that would rate as either level 1, 2, or, 3 and to provide additional clarity on the definition of the qualitative criteria. Descriptions are not intended to be comprehensive.</i>
Level 2	
Level 3 (Best Case)	

Ease of Use	The extent to which the ATS facilitates the operator's ability to use the system.
Level 1	<ol style="list-style-type: none"> 1. Paper technical manuals 2. UUT specific training required for operators
Level 2	<ol style="list-style-type: none"> 1. Menu driven interface 2. UUT specific training required for operators
Level 3	<ol style="list-style-type: none"> 1. Graphical user interface with integrated technical manuals 2. Representative UUT training versus UUT specific training required for operators

Operational Suitability	The ability of the ATS to operate in its intended environment.
Level 1	<ol style="list-style-type: none"> 1. Extensive facility/ATS modifications required for temperature, pressure, moisture, filtration, and/or power fluctuations inherent to operating environment 2. If mobility is a requirement, ATE can not be relocated
Level 2	<ol style="list-style-type: none"> 1. Requirements of temperature, pressure, moisture, filtration, and/or power fluctuations inherent to operating environment can be supported with external augmentation 2. If mobility is a requirement, ATE can not be relocated without extensive set-up/tear-down time and external equipment
Level 3	<ol style="list-style-type: none"> 1. No external augmentation is required to operate in intended environment 2. If mobility is a requirement, ATE is man-portable and requires no alignment procedures

TPS Transportability	The ability to transport a Test Program Set (TPS) to a DoD standard ATE.
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Level 1	1. New TPS hardware and software would be required; Unique ATS environment
Level 2	1. TPS can be transported with minimal modifications to either the TPS hardware or software; Translator would have to be developed or the TPS would have to be only recompiled.
Level 3	1. TPS can be transported without modification to hardware and software; DoD ATS standard environment

<i>Upgradeability</i>	<i>The ability of the test system to be enhanced.</i>
Level 1	1. Custom design (Peculiar Support Equipment) 2. ATS does not use industry standards
Level 2	1. Common system design (Common Support Equipment) 2. ATS uses a mix of industry and system unique standards
Level 3	1. Common Support Equipment with an open architecture 2. ATS is an industry standard

<i>Age of ATS</i>	<i>Years since IOC</i>
Level 1	1. 10 years or more
Level 2	1. 5-10 years
Level 3	1. 0-5 years

<i>Vertical Commonality</i>	<i>The extent to which the ATE will be used to support the weapon system at field, depot and factory levels such that the non-recurring investment made in ATS can be minimized.</i>
Level 1	1. Field, depot, or factory only
Level 2	1. Field and/or depot and/or factory (two of three levels)
Level 3	1. Field, depot, and factory

<i>Horizontal Commonality</i>	<i>The extent to which the ATE is used by other weapon systems either within a Service or in DoD.</i>
Level 1	1. PSE

Level 2	1. Supports multiple systems within a single Service or a single system in multiple Services
Level 3	1. Supports multiple systems within multiple Services

<i>Life Cycle Supportability</i>	<i>Ability to support ATS through its intended life cycle.</i>
Level 1	1. No guarantee of ILS through life cycle 2. No CFA involvement
Level 2	1. Incomplete ILS through life cycle 2. CFA involvement
Level 3	1. Full ILS established for intended life cycle 2. Full CFA involvement or CLS for the life of the system

<i>Ease of TPS Development</i>	<i>The extent to which the engineering effort associated with TPS development is facilitated. (Parametric analysis using SSM+ will both facilitate and substantiate these scores)</i>
Level 1	1. No tools available; must generate software and algorithms without automated tools 2. Complex conventional software coding 3. Extensive and complex hardware interface design 4. Extensive and complex hardware/software integration requirements
Level 2	1. Peculiar software tools available 2. Moderately complex software coding 3. Moderately complex hardware interface design 4. Moderately complex hardware/software integration requirements
Level 3	1. Extensive availability of industry standard software tools 2. Graphical user interface with standardized or open environment for software development 3. Simple hardware interface design 4. Minimally complex hardware/software integration requirements

<i>Adaptability</i>	<i>The ability of a test system to be reconfigured to test a UUT not previously tested on that system.</i>
Level 1	1. None; hardware and software is not reconfigurable

Level 2	<ol style="list-style-type: none">1. Contains modular standard interfaces for hardware and software2. ATE contains provisions for expansion
Level 3	<ol style="list-style-type: none">1. Contains open architectures

Section (3) – Qualitative Factors Source and Rationale Form

ALTERNATIVE: [NAME OF ATE]

Ease of Use

RATIONALE: [Provide explanation for rating level assigned and source of information such as engineering analysis, performance specification, contract requirement, etc]

POINT OF CONTACT: [Name/Phone#/Organization]

Operational Suitability

RATIONALE:

POC:

TPS Transportability

RATIONALE:

POC:

Upgradeability

RATIONALE:

POC:

Age Of ATS

RATIONALE:

POC:

Vertical Commonality

RATIONALE:

POC:

Horizontal Commonality

RATIONALE:

POC:

Life Cycle Supportability

RATIONALE:

POC:

Ease of TPS Development

RATIONALE:

POC:

Adaptability

RATIONALE:

POC:

Section (4) – Procedures for Cost Analysis

Guidance for performing ATS cost analyses when preparing Policy Deviation Requests (PDRs) and Commercial Tester Acquisition Validation Requests (CTAVRs) is provided in this section. Definitions are provided for each cost category that must be considered. To ensure that the cost estimating methodology applied is consistent across all ATS alternatives, substantiating documentation to support all assumptions, sources of information, basis of estimates and calculations must be provided using the form in Section (6) of this attachment. The quality and completeness of costing information will be used as an indicator of the validity of the cost analysis. Cost factors that must be considered when preparing PDRs or CTAVRs are as follows:

Cost Category	Required for PDR LCC and Cost Benefit Analyses	Required for CTAVR
1.0 INVESTMENT COSTS		
1.1 ATE Development	Yes	No ^{Note 1}
1.2 ATE Production	Yes	Yes
1.3 TPS Development	Yes	Yes
1.4 TPS Production	Yes	Yes
1.5 Initial Training	Yes	No ^{Note 2}
1.6 Interim Support	Yes	No ^{Note 2}
1.7 Initial ATE Support/ Maintenance	Yes	Yes
2.0 SUSTAINING COSTS		
2.1 Manpower	Yes	No ^{Note 2}
2.2 Sustaining Training	Yes	No ^{Note 2}
2.3 ATE Support/Maintenance	Yes	Yes
2.4 ATE In-Service Engineering	Yes	Yes

Note 1: ATE development costs are sunk for DoD ATS Family testers and should not be incurred for commercial testers.

Note 2: These costs have typically been insignificant factors in previous CTAVRs and are not required. These costs may be included at the option of the office preparing the CTAVR.

1.0 Investment Costs:

Investment costs include those costs associated with the development and acquisition of all required ATE and TPSs, initial ATE operator/maintainer training, interim weapon system support, and the acquisition of all required ATE support/maintenance equipment. Any costs associated with extending the service life of the ATE and/or TPSs for their intended life cycle, i.e., the service life of the weapon system(s) supported are also included.

1.1 ATE Development Costs:

Definition: ATE development costs include all costs associated with the development and testing of the ATE, including non-recurring engineering, ILS, technical data, and documentation. Any future investments required to upgrade or sustain ATE should also be considered. Unique modifications required to provide additional capability to support the candidate weapon system(s) testing requirements on the DoD ATS Families should be reflected in the costs of Test Program Sets (TPSs). For DoD ATS Families, the development cost is considered sunk.

Acceptable estimating methodologies: Formal contractor cost proposal, escalated historical buys of similar equipment, parametric hardware/software models, or engineering cost estimates.

1.2 ATE Production Costs:

Definition: ATE production costs include all recurring costs to satisfy the inventory objective. For DoD ATS Families, only a fair share of this cost, based upon the workload required to support the weapon system(s) at the scheduled sites, should be reflected.

Acceptable estimating methodologies: Actual contract costs, formal contractor cost proposal, escalated historical buys, parametric hardware/software models, or engineering cost estimates. For DoD ATS Families, the latest ATE production costs can be obtained from the appropriate Program Office.

1.3 TPS Development Costs:

Definition: All costs associated with the development and testing of TPSs including ILS, technical data, and documentation are included under TPS Development Costs. Any costs associated with modifying these TPSs to accommodate future ATE modifications should also be considered.

Acceptable estimating methodologies: Actual contract costs, formal contractor proposal, escalated historical buys, or TPS Cost Model. The Navy has developed a Standard TPS Cost Management System (STCM) to provide a standard methodology for TPS cost estimation across all ATE platforms. The NADEP Jacksonville Rough Order of Magnitude (ROM) Model is also available for developing CASS TPS Cost Estimates. Assistance in generating TPS development costs for DoD ATS Family testers may be obtained from the appropriate Program Office. The office preparing the cost analysis must show that equivalent TPS development tasks are considered across each ATE platform to ensure consistency among TPS cost estimates.

Note: TPS development and production costs should be equivalent across ATE platforms with similar test capabilities and may be considered a “wash”. When shortfalls exist with a tester platform to fully support a UUT, the costs to provide additional test capability can be captured as either a TPS or ATE Development/Production cost. For DoD ATS Family members, these costs should be determined with assistance from the technical POC for the ATS Family member.

1.4 TPS Production Costs:

Definition: TPS production costs include all recurring costs to meet the TPS inventory objective.

Acceptable estimating methodologies: See 1.3 TPS Development Costs.

1.5 Initial Training:

Definition: Initial training includes all non-recurring costs associated with establishing training schools/courses and initial field-level ATE operator/maintainer personnel training. For DoD ATS Families, the cost to develop training courses is considered sunk. Any costs associated with TPS developer training should be included and separately itemized in 1.3 TPS Development Costs.

Acceptable estimating methodologies: Formal contractor proposal, escalated historical training cost data, or logistics estimates. For DoD ATS Families, the latest ATE training costs can be obtained from the appropriate Program Office.

1.6 Interim Support Costs:

Definition: Interim support costs are those costs associated with supporting the weapons system until TPSs are available. Assuming TPSs can be made available at the same time for all ATS alternatives, this cost should be considered sunk. Where selection of one ATS alternative results in a delay in providing ATS support to the weapons system, the delta cost to provide interim support should be identified.

Acceptable estimating methodologies: Formal contractor proposal, escalated historical logistics cost data, or logistics estimates.

1.7 Initial ATE Support/Maintenance Costs:

Definition: Initial ATE support/maintenance costs include all non-recurring and recurring costs associated with procuring initial support capability for the ATE itself (support of support equipment, spares, depot repair capability and software support, for example). A description should be provided of the ATE's maintenance plan with support equipment requirements itemized. Initial ATE support/maintenance requirements should be driven by the planned ATE maintenance philosophy. Costs to be considered under various ATE maintenance philosophies are as follows:

- Contractor ATE Support – Initial maintenance/calibration contract and spares pool investment.
- Organic ATE Support – Calibration standards, support equipment, provisioning spares investment, and special tools/fixtures. For the DoD ATS families, only the incremental costs associated with providing this capability at new/existing sites should be considered.

To ensure consistency among LCC analyses, the same ATE maintenance philosophy should be considered for all ATE alternatives.

Acceptable estimating methodologies: ATE's Logistics Requirement Funding Summary or other logistics funding information document, formal contractor proposal, escalated historical logistic cost data, or logistics estimates. For DoD ATS Families, the latest Initial ATE support/maintenance costs can be obtained from the appropriate program office.

2.0 Sustaining Costs:

Sustaining costs include all costs associated with operating and maintaining the ATS over its intended life cycle. These costs should be priced annually across the life of the ATE.

2.1 Manpower:

Definition: Manpower consists of the annual cost of ATE operator and maintainer personnel over the life cycle. Assuming that the DoD ATS Family tester and the proposed ATE have sufficient test capability, comparable test times can be expected. The weapon system failure rate will not vary between different ATE. Consequently, operator cost should be equivalent across alternatives and may be considered a “wash”. Maintainer and technician support costs should be driven by the ATE maintenance philosophy under consideration. ATE maintenance personnel costs are expected to decrease at sites where ATE is already in place to support another program.

Acceptable estimating methodologies: ATE's Logistics Requirement Funding Summary or other logistics funding information document. For DoD ATS Families, the latest ATE manpower requirements can be obtained from the appropriate Program Office.

2.2 Sustaining Training:

Definition: This cost includes sustained training of operators, maintainers, and technicians over the life cycle. For ATE operated and maintained by military personnel, this is usually 1/3 of initial training, reflecting a tour length of three years. Due to lower turnover rates, these costs are expected to decrease when civilian personnel are utilized.

Acceptable estimating methodologies: ATE's Logistics Requirement Funding Summary or other logistics funding information document.

2.3 ATE Support/Maintenance:

Definition: The annual cost of intermediate and depot level maintenance repair and calibration actions on the ATE. If the ATE will be supported through a maintenance contract with the ATE prime contractor, then back-up documentation should be provided to show what is included in the contractor support package and the expected operational availability. In order to select the most cost beneficial alternative, the Program Manager's office performing the ATS selection should evaluate all feasible support maintenance philosophies for the alternatives being considered in the CBA.

Acceptable estimating methodologies: ATE's Logistics Requirement Funding Summary or other logistics funding information document. For DoD ATS Families, the projected annual ATE Support/Maintenance costs can be determined with assistance from the appropriate Program Office based on the planned ATE support philosophy.

2.4 ATE In-Service Engineering (ISE):

Definition: ATE ISE includes all annual recurring costs incurred for the government or a contractor to provide sustaining engineering (e.g., resolving engineering investigations and parts obsolescence issues) and logistics (e.g., maintaining technical manuals) support. This cost category should include the costs of establishing and operating a Cognizant Field Activity (CFA) for the ATE as well as any annual software licensing fees. This cost category is considered sunk for DoD ATS Family testers because CFAs are established and annual operating costs will not vary with the number of stations and/or sites.

Acceptable estimating methodologies: ATE's Logistics Requirement Funding Summary or other logistics funding information document.

Section (5) – Cost Analysis Summary Form

Cost Category	Recommended Alternative	Closest DoD ATS Family Alternative	Additional Alternative
Alternative Name:	_____	_____	_____
<i>1.0 INVESTMENT COSTS</i>			
1.1 ATE Development			
1.2 ATE Production			
1.3 TPS Development			
1.4 TPS Production			
1.5 Initial Training			
1.6 Interim Support			
1.7 Initial ATE Support/Maintenance			
<i>2.0 SUSTAINING COSTS</i>			
2.1 Manpower			
2.2 Sustaining Training			
2.3 ATE Support/Maintenance			
2.4 ATE In-Service Engineering			
Total			

Instructions:

1. Category definitions are found in Section (4)
2. Funding in then-year \$K
3. Calculate costs of the life of the ATS program or weapon system
4. Addendum sheets may be added for explanations and assumptions when needed

Section (6) – Cost Data Back-Up Form

ALTERNATIVE: NAME OF ATE

1.0 INVESTMENT COSTS

1.1 ATE Development

BASIS OF ESTIMATE: [Provide explanations for assumptions, sources of information, and the basis of estimates]

POINT OF CONTACT: [Name/Phone#/ORG]

1.2 ATE Production

BOE:

POC:

1.3 TPS Development/Production

BOE:

POC:

1.4 TPS Production

BOE:

POC:

1.5 Initial Training

BOE:

POC:

1.6 Interim Support

BOE:

POC:

1.7 Initial ATE Support/Maintenance

BOE:

POC:

2.0 SUSTAINING COSTS

2.1 Manpower

BOE:

POC:

2.2 Training

BOE:

POC:

2.3 ATE Support/Maintenance

BOE:

POC:

2.4 ATE/TPS In-Service Engineering

BOE:

POC:

Attachment 4. DoD ATS Policy Deviation Approval Form

From: Program Manager, _____
To: Service Milestone Decision Authority
Via: Service ATS Management Board Representative
DoD ATS Management Board

Title: ATS Recommendation for _____
[State the weapon system(s) requiring support]

Background: [State the support requirement in terms of parametric, operational and maintenance level requirements, the ACAT level and milestone phase of the weapon system, and the program status of the proposed Non-Standard ATS alternative]

Alternatives Considered: [State the ATS options considered in the analysis]

Problem/Issue: [Present the cost, schedule, and/or parametric/operational deficiency in capabilities as justification for not using a DoD ATS Family as the support solution]

Discussion: [Provide any additional supporting background, rationale, or justification]

Recommendation:

Back-Up Information: (as required)

- (1) Parametric Analysis
- (2) Cost/Benefit and Qualitative Analyses with Back-Up Forms
- (3) Summary of Pros and Cons
- (4) Any Additional Substantiating Data

Approved

Disapproved

Service Milestone Decision Authority

Attachment 5. Commercial Tester Acquisition Validation Request Form

Point(s) of Contact:		
Name:	Phone:	
Activity:	E-mail:	
Tester Description (Attach Commercial Specification Data Sheet if available):		
Manufacturer:	Model Number:	
Type of Tester: (Analog, Digital, RF, EO, etc)		
Instrument List: (DMM, O-Scope, Counter/Timer, etc)		
Tester Application:		
Weapon System(s):	Maintenance Level(s): (O / I / D / F)	
No. of WRAs/LRUs:	No. of SRAs/SRUs:	
Weapon System Support Date: (ATE/TPS Need Date)		
<i>(1) Show that the tester meets the commercial item definition in the DFAR 2.101 (Must be used by the general public or by non-governmental entities for purposes other than governmental purposes, and (i) has been sold, leased, or licensed to the general public; or has been offered for sale, lease, or license to the general public):</i>		
Is the tester regularly used for other than Government purposes and sold or traded in the normal course of business? (Yes / No)		
Examples of a Commercial Application:	Examples of a Government Application:	
<i>(2) Show how the tester provides a more economical solution than a DoD ATS Family tester:</i>		
Costs	Commercial Tester	“Closest Fit” DoD Family Tester
ATE Acquisition		
ATE Support/Maintenance Initial Acquisition		
TPS Development		
TPS Production		
ATE Support/Maintenance		
ATE In-Service Engineering		
TOTAL COSTS		
<i>(3) Show how the tester meets DoD ATS Technical Architecture requirements:</i>		
<i>(4) Other than TPS Development efforts, identify all non-recurring costs associated with this acquisition:</i>		

